Water Quality and the Wisconsin Cheese Industry

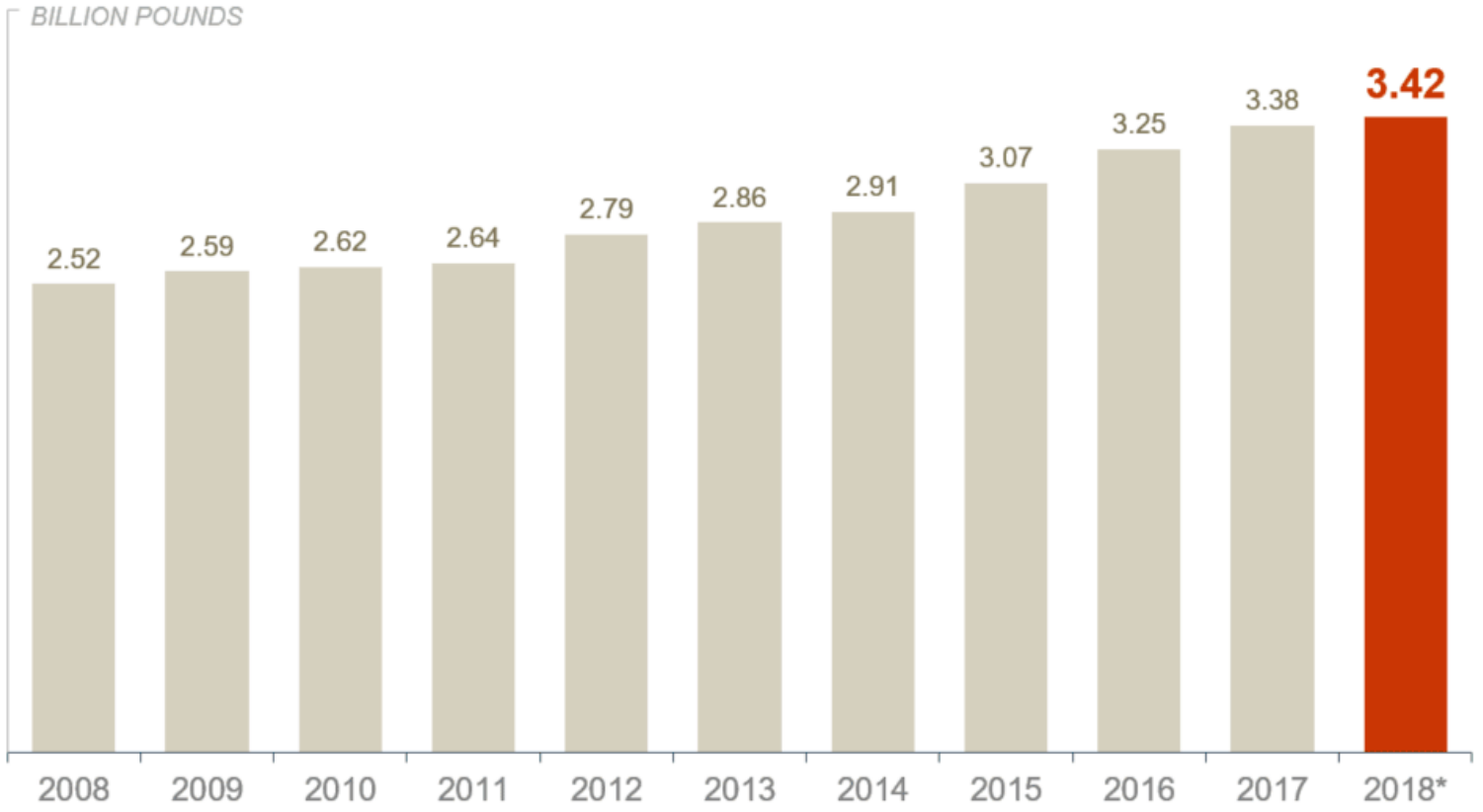
WISCONSIN CHEESE MAKERS ASSOCIATION PRESENTATION

WATER QUALITY TASK FORCE

JUNE 12, 2019

Wisconsin Cheese Production, 2008-2018

Wisconsin produced a record-breaking **3.42 billion pounds** of cheese in 2018, an increase of 36% over the past decade

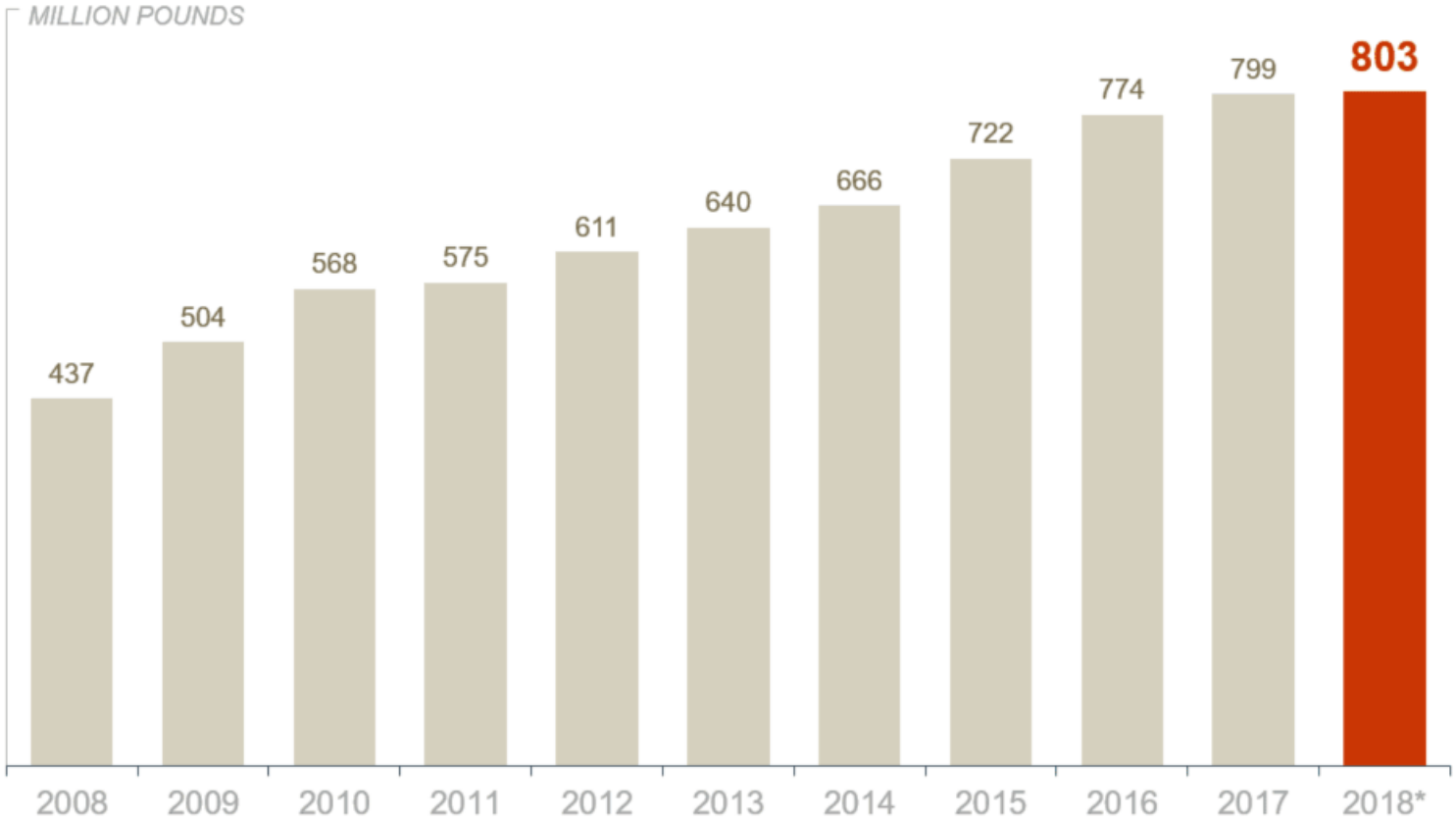


DAIRY FARMERS OF WISCONSIN

Source: USDA, Dairy Products Annual Summary
* Preliminary estimate; Excludes cottage cheese

Wisconsin Specialty Cheese Production

Wisconsin specialty cheese production **topped 800 million pounds** in 2018, an increase of 84% over the past ten years

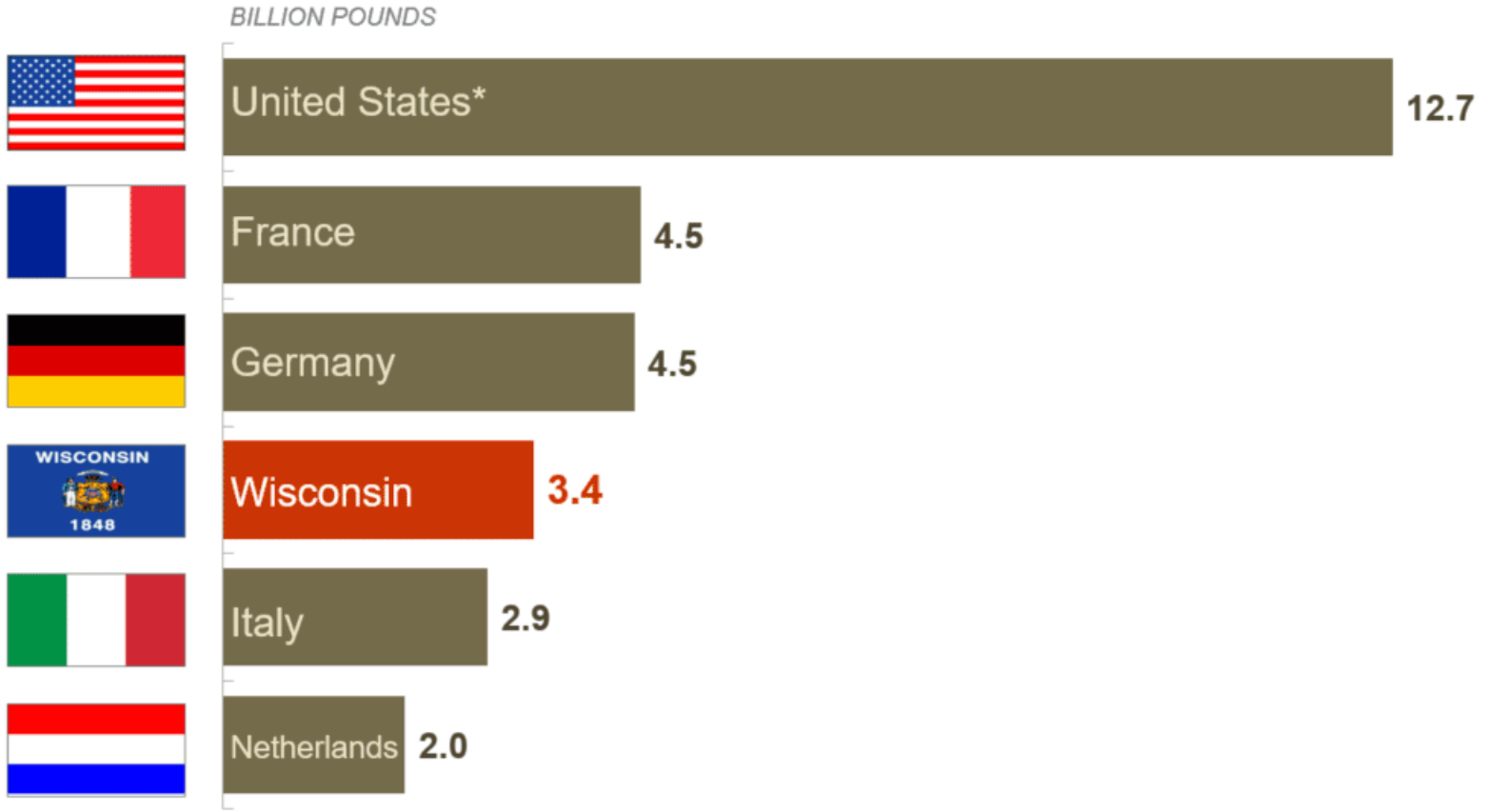


DAIRY FARMERS OF WISCONSIN

Source: WASS, Specialty Cheese
* Preliminary estimate; Excludes cottage cheese

Wisconsin Rank Among Countries, 2017

If Wisconsin were a country, it would rank 4th in the world in cheese production

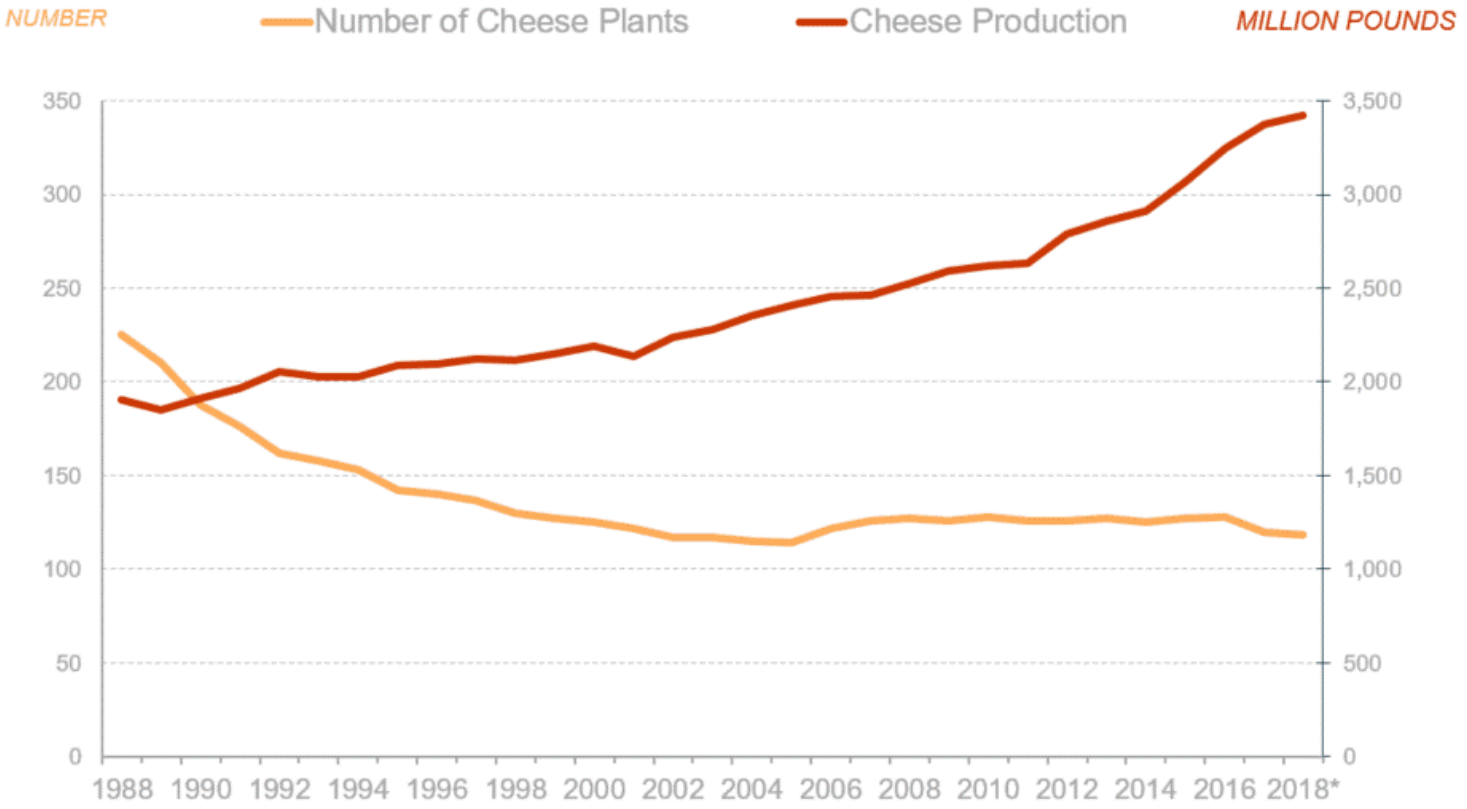


DAIRY FARMERS OF WISCONSIN

Source: USDA, Dairy Products Annual Summary; EuroStat Online Database
* Includes Wisconsin; Excludes cottage cheese

WI Cheese Production vs. No. of Plants

While Wisconsin had 48% fewer cheese plants in 2018 than in 1988, the state produced **80% more cheese**, thanks to rising production per plant



DAIRY FARMERS OF WISCONSIN

Source: USDA, Dairy Products Annual Summary
* Preliminary estimate; Excludes cottage cheese

Water Quality

Dairy processing and water quality in Wisconsin intersect at dairy plant cleaning and disposal of cheese brine.

Wash-up water = Wastewater

Water Quality

In a recent survey, dairy plants reported a range of 82 to 225 gallons of wastewater produced per 1,000 pounds of milk processed.

Or about 153,000 gallons/day in a large cheese plant.

Water Quality

The “waste” in this wastewater comes from:

- Spilled milk or curd particles
- Cleaners & sanitizers

Dairy processing loses about 3% of milk taken in

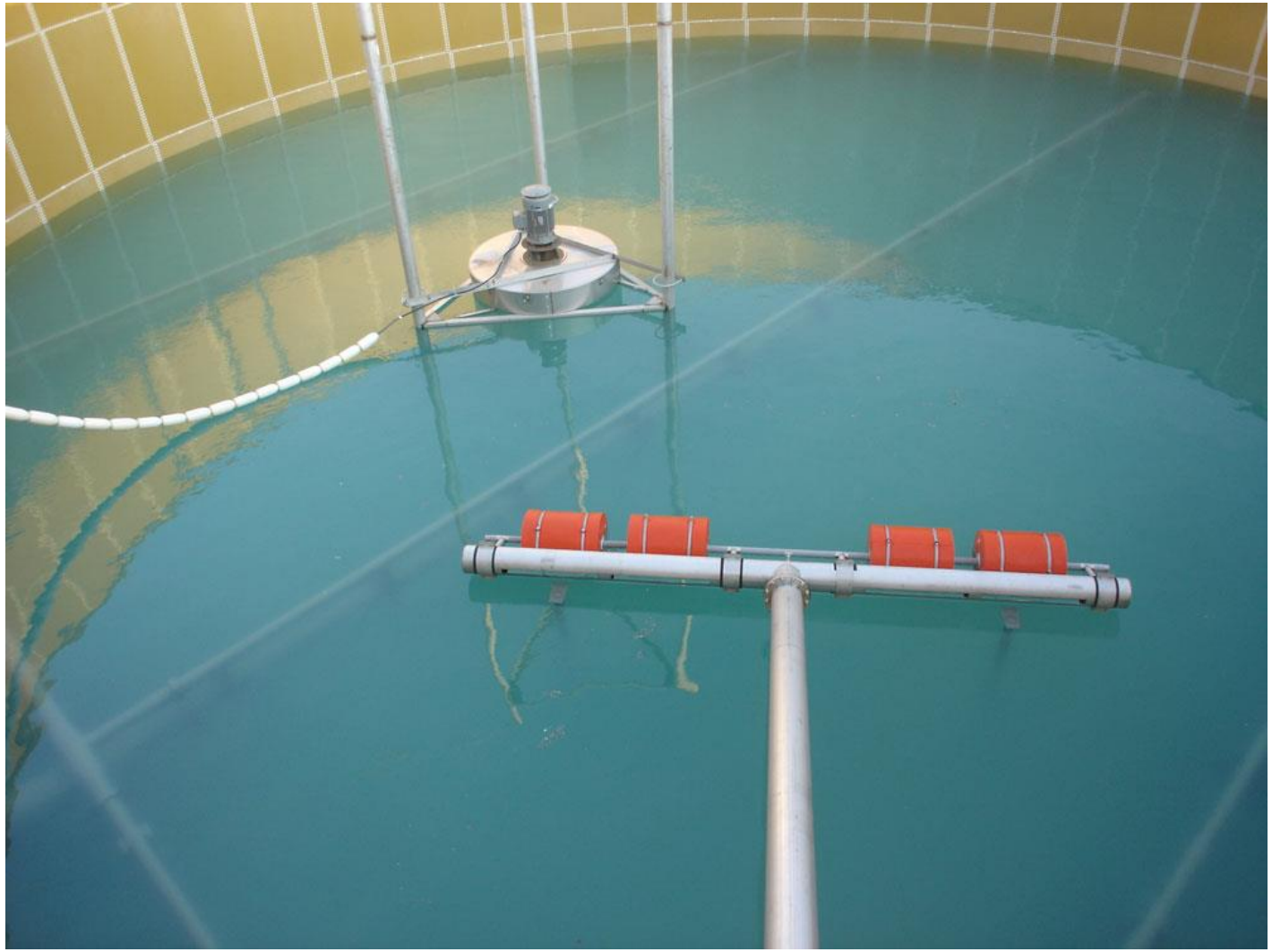
Nutrients in Dairy Plant Wastewater

Here's the chemical composition of cheese plant wastewater

Constituent	*mg/L*
Nitrogen	91
Phosphorus	71
Chloride	276
Calcium	49
Magnesium	21
Ammonia N	8

Water Quality

Processing of Phosphorus, Nitrogen and Chlorides is the cheese industry's intersection with Wisconsin DNR & EPA.



Phosphorus

DNR water-quality based regulation of Phosphorus (P) has found the cheese industry typically moving from:

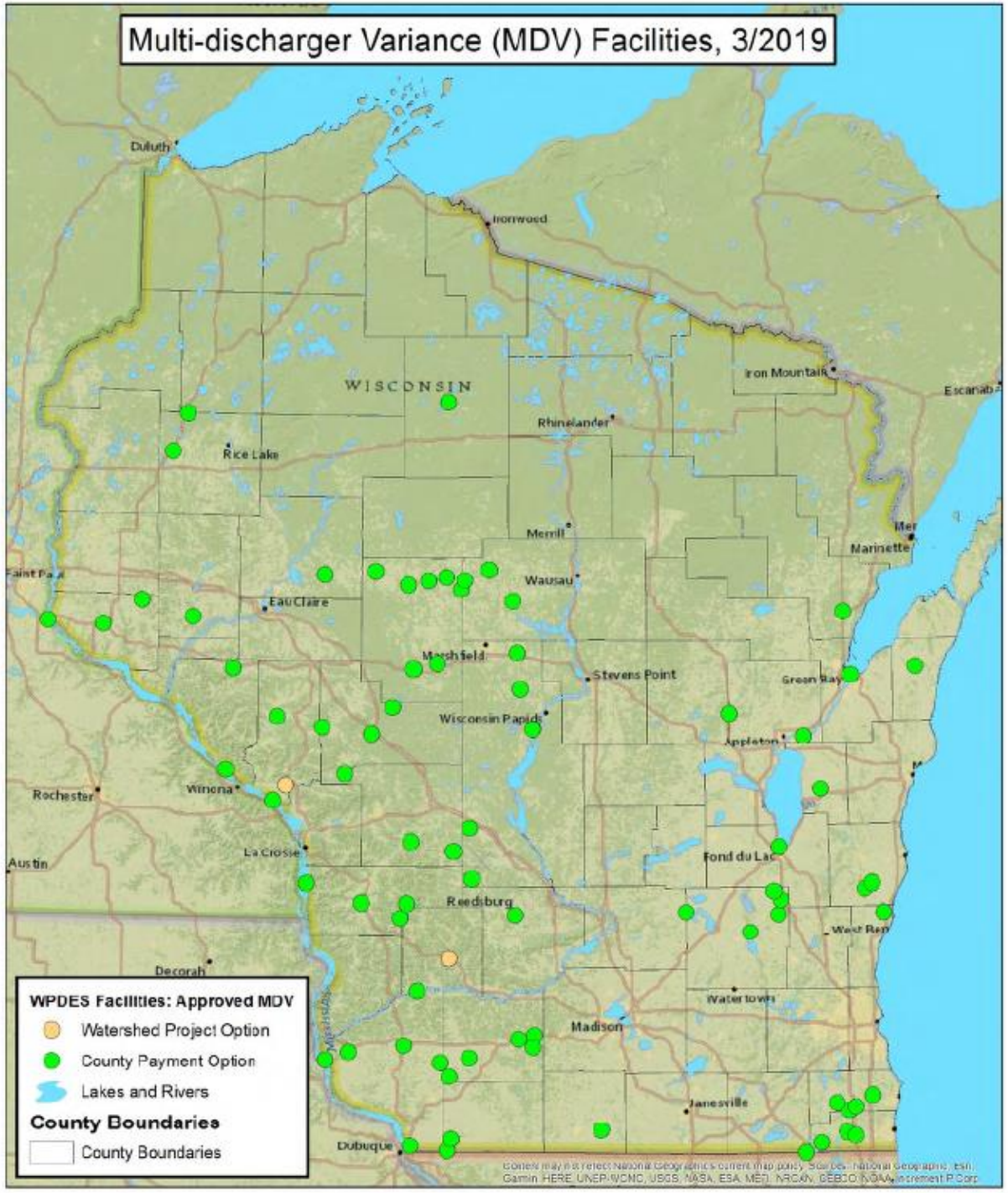
1-2 mg/l P in wastewater to 0.075 mg/l P (streams limit)

Phosphorus

The Wisconsin Legislature assisted municipalities, and the food and paper industries, with the Multi-Discharger Variance, constructed with Wisconsin DNR and approved by EPA in 2017.

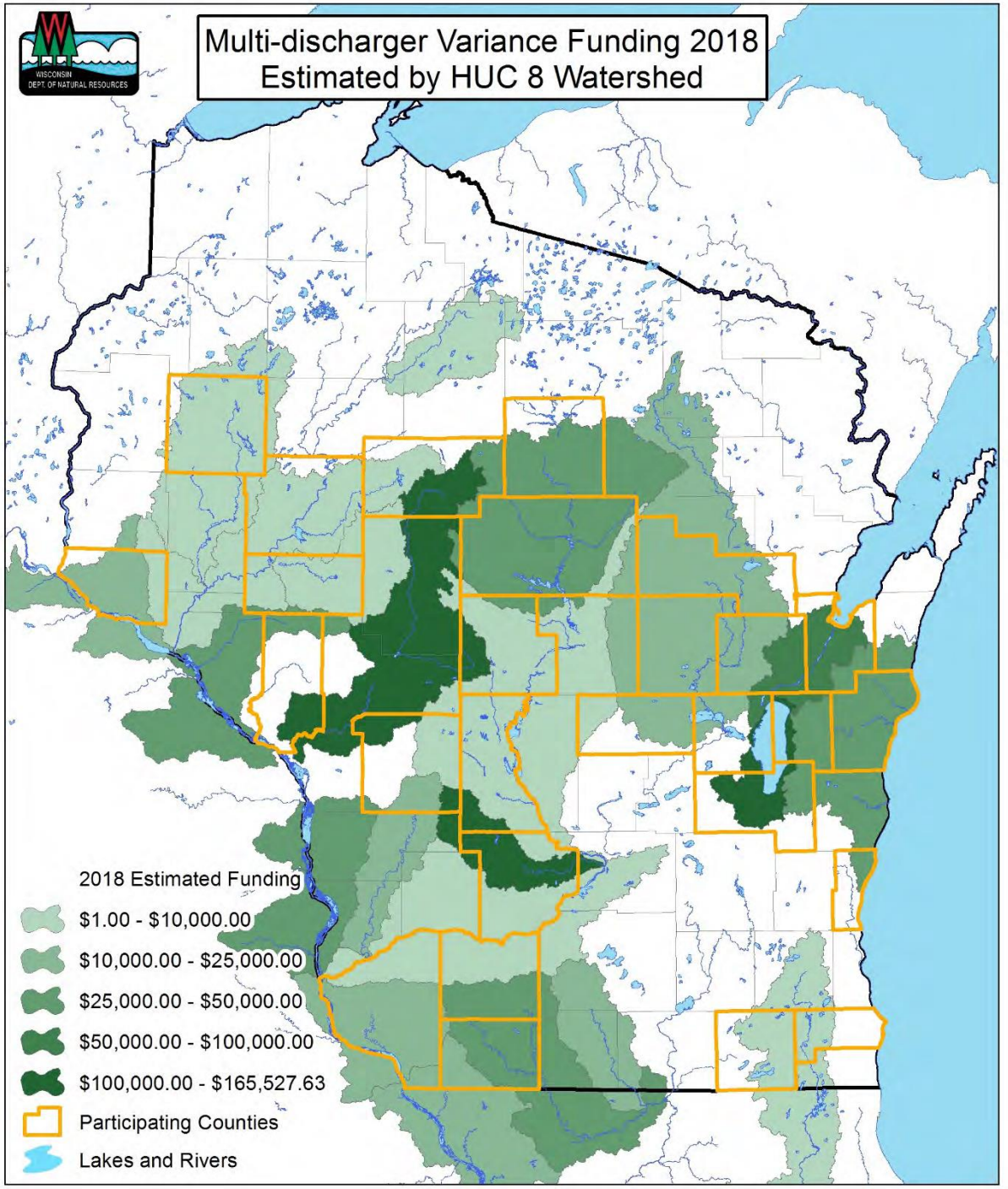
Multi-Discharger Variance

78 facilities have approved variances, including 6 cheese plants in Wisconsin.



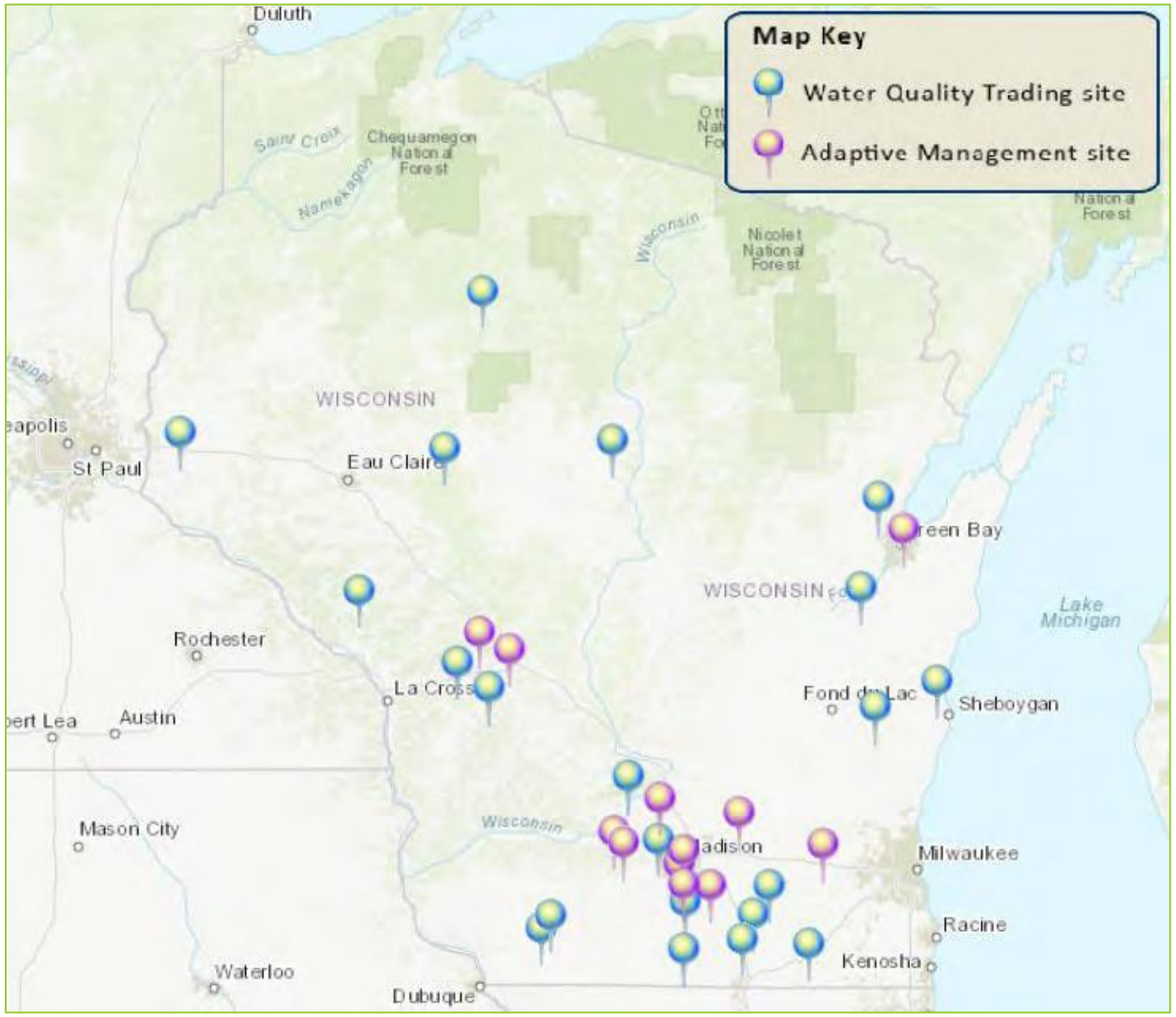
Funds gained from MDV

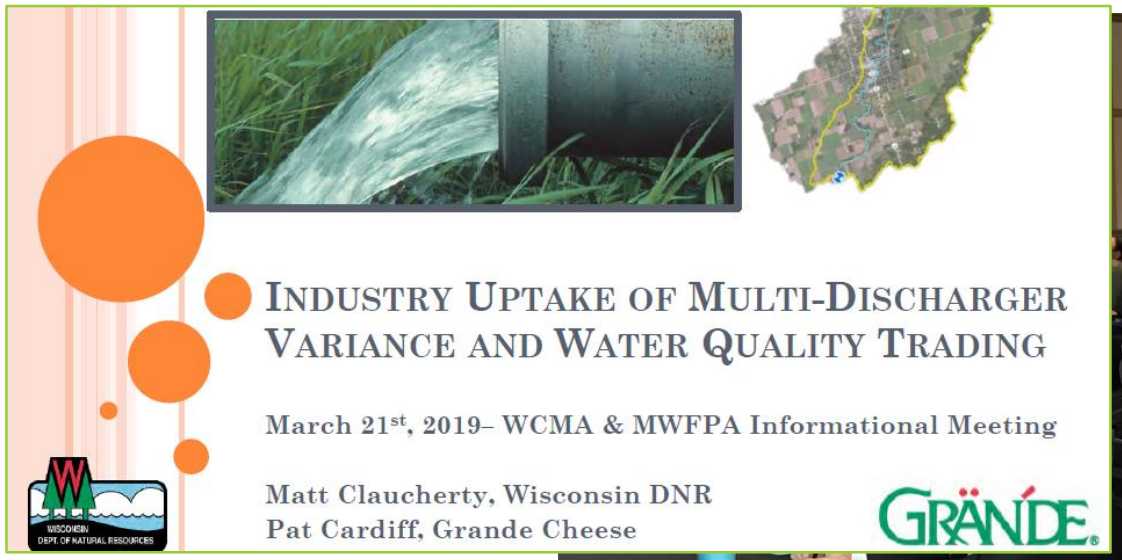
41 facilities paid a total of $619,000 to 27 counties in 2018.



Water Quality Trading

DNR Phosphorus regulations allowed for trading within a watershed and 16 trades have been approved, including 4 in the cheese industry.





WCMA holds an annual information meeting with DNR and Midwest Food Processors each spring.

Nitrogen

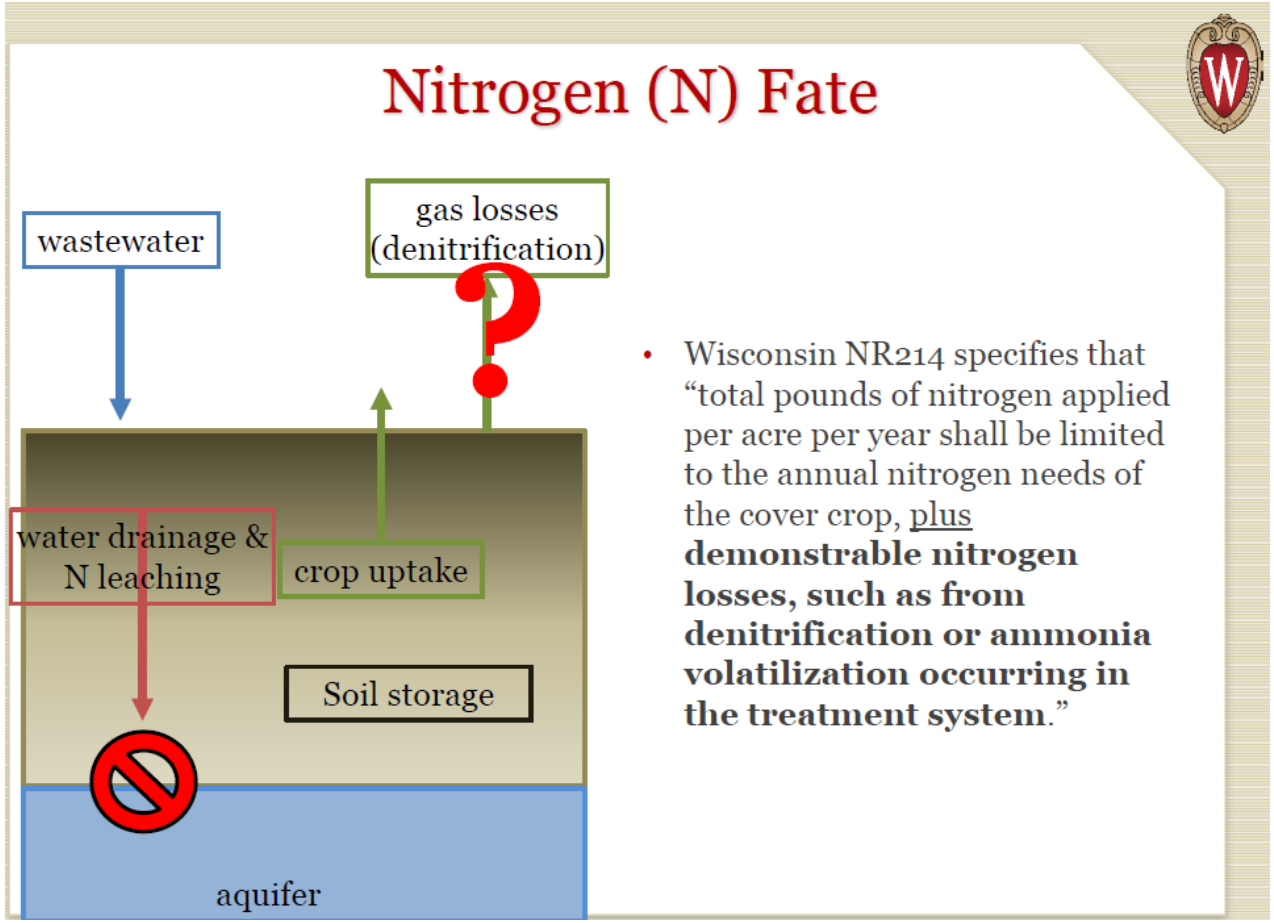
DNR regulates the amount f Nitrogen (N) that points sources can apply to land (soil-based) treatment systems.

Spray irrigation and ridge-and-furrow systems remove N via cover crops and denitrification.

These systems are cost-effective for smaller, artisan cheesemakers.

Partners in Nitrogen Research

In 2016, WCMA, DNR and Midwest Food Processors co-funded UW research to learn how soil-based treatment systems use soil bacteria to remove nitrogen.

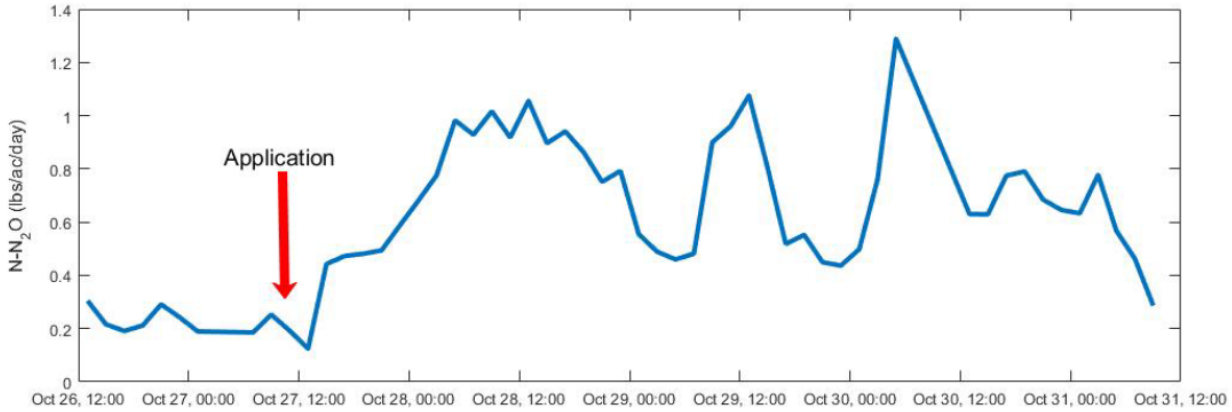


Partners in Nitrogen Research

The report, completed this spring, documented denitrification rates, made process recommendations and proposed further research.

3.2 Denitrification Measurements Using Gas Emission Data

Measured denitrification between the three RF sites displayed similar profiles both preceding and following wastewater application events (Figure 4). Limited denitrification was occurring before each application event, and as wastewater entered the cell, the combination of anaerobic conditions, increased nitrogen and increased carbon lead to significantly increased denitrification for approximately five days following wastewater application. During those five days, diurnal peaks in denitrification followed daily temperature fluctuations. As water drained through the profile, the amount of oxygen present increased, disrupting denitrification conditions. Denitrification also decreased over time as the N and C added with the wastewater application was consumed by soil microbes.



Partners in Nitrogen Research

DNR staff has joined food and dairy wastewater technicians in annual field days to review research project field studies.

Looking Forward

Wisconsin's dairy industry works closely with DNR to manage Phosphorus and Nitrogen in treatment systems.

Senate Bill 91, an innovative plan to create a clearinghouse for farms to sell nutrient credits and permit-holders to buy credits, can incent more nonpoint run-off control while keeping compliance affordable.

One More Innovation

Milwaukee looking to use cheese brine to salt their roads in their winter

Large Photo

A A A SHARETHIS

Recommend 5 people recommend this.

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Posted: 09/13/2013

MILWAUKEE - How do cheeseheads de-ice their roads? With, cheese, of course.

Milwaukee's Department of Public Works is trying something new this winter. Cheese brine will be mixed with rock salt. It's an inexpensive by product of the cheesemaking process.

The city says cheese brine will stretch the rock salt and the lessen the possible environmental impact.

Why and How to Clean Cheese Brine for Application onto Roads for De-icing

Presented to the Joint Meeting of Wis. DNR, Wisconsin Cheese Makers Association and Midwest Food Processors Association

Mike Molitor
Process Pilot Plant Manager

March 21, 2019

One More Innovation

Chlorides are a concern in dairy plant wastewater and today, about 75% are land applied according to DNR regulations, while 20% flow to municipal treatment systems.

Wisconsin DNR has recognized a useful recycling of brines as a roadway deicing additive.

Liquid salt brine is offered free to several state counties and reduces salt purchases while providing a liquid form that adheres better to roadways.

In Conclusion

Innovation

- Multi-Discharger Variance, Brine Use on Roadways, Nutrient Trading with SB91

Communication

- Industry/DNR Information Meetings and Joint Field Days

Science

- Joint funding of University Research

Wisconsin is a leader in effective wastewater processing

Thank you